Space Weather Forecast

Issued on Friday, 17 May 2024 at 00:17 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Slight chance of further Strong class flares throughout. Chance of S1/Minor Solar Radiation storming Day 1 (17 May).

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has been Moderate with an isolated Moderate flare observed at 16/0804 UTC, attributed to a large region close to the southeast limb. Any activity from the large and active region that was responsible for a number of recent Strong flares is now likely to be completely obscured as it has fully retreated onto the far-side. There are currently fourteen sunspots on the disc. The largest is the aforementioned region that lies close to the southeast limb. This region is composed of a number of large spots which may be a closely connected collection of different regions, however, magnetic looping is visible across the region and as such it remains classed as one large sunspot group. A new region continues to emerge from the southeast limb, just to the north of this group, although the limited viewing angle reduces confidence in its analysis. There are three other regions of modest size that also exhibit some magnetic complexity, one in the southwest, one in the southeast and one close to the solar meridian in the south. The other sunspot regions are generally smaller, simpler and stable.

A filament eruption was observed around 16/1645 UTC which is thought to have produced a coronal mass ejection (CME) that was visible on available coronagraph imagery. This CME may have an Earth-directed component, but this is low confidence with analysis underway. Otherwise, no Earth-directed CMEs were identified in available imagery.

Solar Wind / Geomagnetic Activity: A CME arrival was noted on solar wind parameters around 16/0430 UTC, this from an uncertain source. Solar winds increased to 470-500km/s where they remained for much of the period. Wind speeds declined gradually from around 16/1200 UTC, returning to background levels by 16/2000 UTC and are currently around 380 km/s. Interplanetary Magnetic Field (IMF), Bt, was initially weak, but exhibited an erratic increase to a brief peak at strong levels following the CME arrival. Values subsequently fell to weak levels and have since remained steady. The important north-south component was weakly negative initially, becoming more moderately negative following the CME arrival. Since around 16/0930 UTC the north-south component has weakly fluctuated, but remained mostly positive (north oriented). Geomagnetic activity was Quiet to Unsettled (Kp 1-3), but with a G2/Moderate geomagnetic storm interval recorded 16/0600-0900 UTC following the CME arrival, and a G1 Minor geomagnetic storm interval 16/0900-1200UTC. Activity then gradually declined back to Quiet levels (Kp 1-2).

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) was above at S1/Minor Radiation storm levels until 16/1200 UTC due to the flare activity over recent days from the large complex sunspot (now over the southwest limb). This count rate continues to very gradually ease.

Four-Day Space Weather Forecast Summary

Solar Activity: Low to Moderate activity is now expected, with a slight chance of further Strong class flares. These mainly from the new region that lies close to the southeast limb. The regions

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currently on the visible disc are smaller and simpler, with isolated M-flares possible from these. A new region may rotate onto the northeast disc later Day 1 or Day 2 (17-18 May) with no other significant regions expected to return or rotate onto the disc during the period.

Solar Wind / Geomagnetic Activity: A glancing coronal mass ejection (CME) arrival is possible later Day 1 (17 May) from a filament eruption on the northeast disc on 14 May. Solar winds are expected to remain at background levels, but close to slightly elevated levels. Chance of some further enhancement from uncertain CME arrival. Activity is expected to be mainly Quiet (Kp 0-2) with Unsettled (Kp 3) intervals. Chance of an Active interval and a slight chance of a G1/Minor Geomagnetic storm intervals from any CME glances, mainly later Day 1 (17 May).

Energetic Particles / Solar Radiation: The count rate of energetic particles is likely to remain at background levels. Although there is a chance that should any significant flares from the large and complex sunspot (now on the far-side) occur on Day 1 (17 May) that enhancement may cross the S1/Minor Radiation storm threshold.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	Yes	10	5	1	1
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	60	60	60	60
Very Active	R3 to R5 X	No	20	20	20	20

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	Yes	50	20	10	10
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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